

CLAIMS

1. A combined set comprising a vibration actuator and an implantable device to be used as an artificial fenestrum implantable in a bony wall of an inner ear, said device comprising a frame made of a bio-compatible material and provided to be applied at least partially in said bony wall, said frame being provided with a wall part formed by a membrane made of a bio-compatible material and forming a barrier with a perilymph of said inner ear when applied in said bony wall, said membrane being provided to form together with said frame an interface with said inner ear, said interface being provided for energy transfer, in particular mechanical and/or electrical and/or electromagnetic energy, towards said inner ear, said vibration actuator being provided for generating a vibration energy, characterised in that said membrane is electrically dissociated from said vibration actuator and provided for receiving said vibration energy from said vibration actuator, said membrane being further provided for transferring energy from said inner ear.

2. A combined set as claimed in claim 1, characterised in that said vibration actuator comprises an electrical signal output circuitry provided for output of said vibration energy, said membrane being electrically dissociated from said circuitry.

3. A combined set as claimed in claim 1 or 2, characterised in that said device is provided with connecting means applied on said frame, said connecting means being provided for connecting said vibration actuator and/or a sensing member into said frame in such a manner as to enable said energy transfer.

4. A combined set as claimed in any one of the claims 1 to 3, characterised in that said vibration actuator is formed by a mechanically driven piston mounted into said frame, said piston being

provided for generating vibrations and being mounted in such a manner as to mechanically contact said membrane.

5. A combined set as claimed in any one of the claims 1 to 3, characterised in that said vibration actuator is formed by an electromagnetic stimulating and/or sensing member mounted into said frame, said member comprising an electromagnetically driven actuator mechanically contacting said membrane within said frame.

6. A combined set as claimed in any one of the claims 1 to 3, characterised in that said vibration actuator is formed by a pressure generator mounted into said frame, said pressure generator being provided for driving said membrane.

7. A combined set as claimed in any one of the claims 1 to 3, characterised in that said vibration actuator is formed by a piezo-electric stimulating and/or sensing member mounted into said frame, said member comprising a piezo-electrically driven actuator mechanically contacting said membrane within said frame.

8. An implantable device as component of a combined set as claimed in any one of the claims 1 to 7, characterised in that said membrane is provided for transferring energy to and from said inner ear.

9. An implantable device as claimed in claim 8, characterised in that a side of said membrane, provided to contact said perilymph when said device is mounted in said inner ear, is provided with electrically conductive means which are connected to a conductive wire applied in an electrically insulated manner on said frame.

10. An implantable device as claimed in claim 8 or 9, characterised in that a side of said membrane, provided to contact said perilymph when said device is mounted in said inner ear, is provided with electrically conductive means which are connected to said frame.

11. An implantable device as claimed in any one of the claims 8 to 10, characterised in that said frame is dimensioned in such a

manner as to insert at least partially said vibration actuator and/or sensing member therein.

12. An implantable device as claimed in any one of the claims 8 to 11, characterised in that said device is substantially cylindrically shaped and provided with a screw thread on upstanding walls.

13. An implantable device as claimed in any one of the claims 8 or 12, characterised in that said membrane is provided to form a substantially hermetical closure between said perilymph and an inner part of said frame when applied in said inner ear.

14. An implantable device as claimed in any one of the claims 8 to 13, characterised in that said membrane is made of titanium.

15. An implantable device as claimed in any one of the claims 8 to 14, characterised in that said frame is coated with antibiotics and/or a substance promoting bone tissue growth.

16. An implantable device as claimed in any one of the claims 8 to 14, characterised in that said frame is coated with a substance improving hermeticity of insertion into said perilymph.